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(21) International Application Number: PCT/SE98/00295 (22) International Filing Date: 19 February 1998 (19.02.98) (30) Priority Data: 9701042-5 21 March 1997 (21.03.97) SE (71)(72) Applicant and Inventor: ERIKSSON, Jan-Olof [SE/SE]; Midsommarstigen 23, S-931 52 Skellefteå (SE). (74) Agents: ONN, Thorsten et al.; AB Stockholms Patentbyrå, Za- cco & Bruhn (publ), P.O. Box 23101, S-104 35 Stockholm (SE).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>
(54) Title: CLEANING AGENT (57) Abstract The invention concerns a cleaning agent characterized in that it is essentially free from tensides and that it is mainly composed of one or more alkali percarbonates or alkali earth metal percarbonates. The agent is preferably made up in the form of a tablet or an aqueous solution, and is principally composed of percarbonate in the form of sodium percarbonate.		

CLEANING AGENT

The present invention concerns a new cleaning agent with improved attributes. In particular, the invention concerns a new cleaning agent that is free from detergents, yet that nevertheless has eminently suitable cleaning qualities.

5 Many different types of cleaning agent are known for use within different areas. Examples of such agents include dishwasher powders, washing machine powders, washing-up liquids, agents for washing by hand, general all-purpose cleaners and degreasing agents. Such agents can be made up in a variety of different ways, for example, as powders, liquids or in dosed units such as tablets. A large number of cleaning agents of different types is known
10 from publications.

A common factor of practically all previously known cleaning agents is that they contain tensides (surfactants) of anionic, cationic and/or non-ionic types as active washing and cleaning substances. Tensides constitute a significant component of known cleaning agents and are responsible for the overwhelming part of the cleaning effect. Their amphiphilic
15 molecules with a hydrophilic and a hydrophobic part bind to the particles of dirt and cause them to be suspended in the aqueous phase. This is well known to a skilled person in this area.

The use of tensides is, however, not without objections. From an environmental standpoint especially, it can be objected that the overwhelming proportion of tensides pass out in the waste water once washing has been completed and thereafter increase the load on waste
20 water purification plants or on the watercourse. Many tensides are also difficult to break down by biological means and cause a significant increase in the oxygen consumption in purification plants or the watercourse. Such reasons have led to a greater desire to minimise the use of tensides in washing and cleaning agents, and the increased environmental awareness has made such aspirations even more noticeable.

25 By means of the present invention, the drawbacks mentioned above are to a large extent removed and users are provided with a washing or cleaning agent that is free from tensides and that has good washing and cleaning qualities. According to the invention, the washing and cleaning agents include active washing and cleaning components composed of one or more alkali or alkali earth metal percarbonates, and are essentially free from tensides.
30 Preferably, the main component of the cleaning agent should consist of one or more of the said percarbonates, and principally of sodium percarbonate.

In one suitable embodiment, the cleaning agent is composed of an aqueous solution that can include currently available auxiliary agents that contribute to the cleaning effect, such

The use of peroxide compounds such as percarbonate is also mentioned in previous documents, for example, GB-A-2 112 428. GB-A-1 355 855, WO 95/13353 and WO 95/27774. However, all of these cases concern compositions for bleaching agents that contain different catalysts or activators for the breakdown of peroxide compounds. The issue at stake the whole time is the use of peroxide compounds together with significant amounts of tensides as the active washing agent, and it is neither stated nor implied that percarbonate itself in low concentrations exerts any washing effect. Only the bleaching effect is emphasised in these previously known documents.

Swedish application 9600663-0 describes the use of sodium percarbonate for controlling micro-organisms, especially hard to control forms such as mucous slime bacteria, yeast fungi and spores. This document does not mention or even imply that percarbonate can have a good cleaning effect against dirt, and a person skilled in this area receives no guidance to the present invention.

Previous attempts have been made to make up a cleaning agent containing sodium percarbonate in the form of an effervescent tablet to achieve rapid dissolving. The effervescent effect is obtained by the tablet containing an acid, such as citric acid, that in water reacts with carbonate to form carbon dioxide. However, this embodiment was shown to have a reduced cleaning effect. When the tablet dissolved in the water, the acid reacted with the percarbonate so that hydrogen peroxide was formed and immediately broken down to water and oxygen, which, in this form, did not have any great cleaning effect. Surprisingly, it was later shown that if the acid was excluded, the cleaning effect increased greatly, and that by this means, the dose could be reduced by up to 50% compared with the effervescent tablet form.

The alkali percarbonates or the alkali earth metal percarbonates used according to the invention are preferably constituted of alkali metal percarbonates, and then principally of sodium percarbonate. Even other percarbonates according to the invention, such as the potassium or the ammonium salt, are technically possible to use, but are less advantageous for reasons of cost.

Percarbonates have a low toxicity and can be considered not to be harmful in small oral doses. In addition, they do not pose any great environmental threat when disposed of via drains. The active acid not used up during the cleaning process passes out into the waste water purification plant and the watercourse, where it can, in fact, even be considered to have a beneficial effect.

As stated previously, the characteristic feature of the cleaning agent according to the invention is that it is free from tensides. This means that the agent contains at the most 5 per-

is advantageous since a tablet that rapidly dissolves quickly gives an effective concentration of cleaning agent during the course of the cleaning.

For use within industry, it can be appropriate to supply the cleaning agent according to the invention in the form of an aqueous solution. Such a solution can also include active washing enzymes to dissolve protein-based stains, and a complex-former, for example, a salt of EDTA or NTA, to bind metal ions. In addition, the solution can suitably contain alkali to provide stability. Suitable auxiliary agents and quantities of these can easily be chosen by a person skilled in this area on the basis of experience or through simple routine testing. A concentrated solution of the cleaning agent according to the invention for industrial use suitably has a pH within the interval 12 to 12.5. The pH value desired can be reached by the addition of alkali such as NaOH, Na₂CO₃ and similar. Usually, an addition of alkali of about 0.5 - 1 % (w/v) is required.

Active washing enzymes and/or complex-formers can naturally also be included in the cleaning agent according to the invention when this is made up in tablet form.

In a comparison of dishwashing and cleaning tests, it has been shown that the cleaning agent according to the invention produces a result at least as good as previously known washing and cleaning agents that contain tensides. When the small amounts required by the cleaning agent according to the invention are borne in mind, and that the use of tensides has been eliminated, this must be considered to be both a technical and an environmental success within cleaning technology.

The invention is made clearer by the following example of an embodiment.

EXAMPLE

The cleaning agent according to the invention in the form of tablets and with different compositions was tested during normal dish washing in a Cylinda 770 dishwasher for 6 place settings under standard conditions. For each phase of the washing cycle, the dishwasher uses about 2.9 litres of water and about 14.5 litres of water were used in total. The dishwashing program was set for a normal wash at 55°C, except for one test, when the temperature was 65°C. Table 1 shows the test results obtained. The compositions of the cleaning agents used are given in table 2.

potassium permanganate as accelerator. With this composition, even a half dose of sodium percarbonate (tablet no. 299) gave an acceptable result. A double-dose of tablet 299, which thus contains twice the amount of enzyme compared with the others, gave by far the best result. Similar results were obtained with tablet no. 1 when the temperature was raised by 10°C.

5 This shows that accelerators contribute to starting the cleaning effect sooner at lower temperatures.

It is also evident that the commercially available dishwashing agent "Sun Micro" did not give a significantly better washing result, despite a considerably larger quantity of active cleaning agents, including a significant amount of tensides.

10 The present description has principally referred to the use of sodium percarbonate as the active cleaning agent, and to its use in specific preparations and embodiments. It is, however, obvious to a skilled person within this area that even other percarbonates and other preparations and embodiments within the scope of the following claims are equally applicable and that they will give similarly advantageous results.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/00295

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: C11D 3/39

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,N0 classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, CLAIMS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9614381 A1 (HARRIS RESEARCH, INC.), 17 May 1996 (17.05.96) --	1-10
A	GB 2112428 A (COLGATE-PALMOLIVE COMPANY), 20 July 1983 (20.07.83) --	1-10
A	GB 1355855 A (THE PROCTER & GAMBLE COMPANY), 5 June 1974 (05.06.74) -- -----	1-10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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